

REMARKS

I. Amendments to Specification and Drawings

Applicants have amended the specification and drawings to correct informalities noted by the Examiner and to make the drawings consistent with the specification. In FIG. 2, element numeral 22 has been renumbered as 28 and element numeral 28 has been renumbered as 22. In FIG. 4, element numerals 36a, 36b and 36c have been respectively renumbered as element numerals 32a, 32b and 32c. In FIG. 14, element numeral 92 has been renumbered as 68. In addition, Applicants have amended FIG. 10 by adding section line 12--12. No new matter has been added by these amendments.

II. Amendments to Claims

Claims 1-31 are pending in the application. New claims 32-41 (including independent claim 41) have been added to further define features of the invention. Support for the new claims can be found in the specification as follows: Claim 32 - page 7, line 22 to page 8, line 9; Claims 33 and 34 - page 8, lines 16-22 and FIG. 3; Claim 35 - page 9, line 2-4 and FIG. 8; Claim 36 - page 5, line 8-11; Claim 37 - page 8, line 10-12; Claim 38-39 - page 8, lines 16-22; Claim 40 - page 8, line 4-9; and Claim 41 - page 15, lines 20-23.

The Examiner stated that claims 7 and 19-22 would be allowable if amended as to form. Claim 7 has been amended to independent form, and claim 19 has been amended to correct a grammatical error. Claims 7 and 19 are therefore in condition for allowance. Original claims 20-22 and new claims 35-39 depend from claim 19 and should be allowed for the same reasons as claim 19.

Amendments to the Drawings

The attached sheets of drawings include changes to FIGS. 2, 4, 10, and 14. These sheets, which include FIGS. 2, 4, 10, and 14 replace the original sheets including FIGS. 2, 4, 10, and 14.

In FIG. 2, element numeral 22 has been renumbered as 28 and element numeral 28 has been renumbered as 22.

In FIG. 4, element numerals 36a, 36b and 36c have been respectively renumbered as element numerals 32a, 32b and 32c.

In FIG. 10, previously omitted line 12—12 has been added.

In FIG. 14, element numeral 92 has been renumbered as 68.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

Applicants have amended independent claims 1, 17, 23, 25, 26 and 27 to include an “optically active liquid”. New claim 41 also recites an “optically active liquid”. As used herein, the term “optically active liquid” means any liquid having “the ability to rotate the plane of incident linearly polarized light, with a dependence on wavelength” (Specification, page 6, lines 8-9). Thus, “[t]he amount of rotation created as a result of optical activity depends on the wavelength of the incoming light.” (Specification, page 6, lines 16-17). See also, specification at page 3, lines 2-3; page 12, lines 7-8, and in FIG. 12. Dependent claims 4, 5, 7, 9, 10, 13, and 29-31 have also been amended to improve form and conform to the amended parent claims.

Claim 3 has been canceled without prejudice.

Claim 9 has been amended to positively recite an “adjustable thickness container” whose thickness is “changed by adjusting the container”. Claim 29 has been amended to recite the method step of “adjusting” the thickness of the optically active liquid. Support for these amendments can be found in the Specification at page 8, lines 16-22.

Claim 10 has been amended to clarify that the optically active device comprises a multiplicity of removable layers of optically active liquid.

Claims 13 and 30 have been amended to recite that “the thickness of the optically active liquid is not uniform such that all polarized light from the light source travels the same distance through the optically active liquid.” Support for these amendments can be found in the Specification at page 11, lines 3-13.

No new matter has been added by any of the foregoing amendments.

III. Claim Rejections

Claims 1-2, 6, 12, 23, 25-28 and 31 stand rejected under 35 U.S.C §102(b) as being anticipated by U.S. Patent No. 4,232,948 to Shanks (“*Shanks*”). Claim 17-18 stand rejected as being anticipated by U.S. Patent No. 5,442,468 to Reznik et al. (“*Reznik*”). Claims 3-5, 8-11, 13, 14-16, 24, 29 and 30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over either *Shanks* alone, *Shanks* in view of *Reznik* or *Shanks* in view of International Publication WO 01/50187 A1 (“*Carmichael*”). Applicants respectfully request reconsideration of these rejections.

A. *Shanks*

The claim rejections under 35 U.S.C. §§102(b) and 103(a) in view of *Shanks* alone (set forth in paragraphs 7 and 10 of the Office Action) must be withdrawn. *Shanks* does not disclose, teach or suggest an optically active device comprising an “optically active liquid” for rotating the polarized light from the polarizer (as recited in amended claims 1, 17, 23, 25, 26 and new claim 41) or a method for producing a colored light wherein the method comprises rotating polarized light through an “optically active liquid” (as recited in the amended claim 27).

Instead, *Shanks* discloses a liquid crystal cell comprising two spaced apart glass plates with a layer of liquid crystal material filling the space. (*Shanks*, Abstract; col. 1, lines 23-27). Applying a voltage to the liquid crystal cell of *Shanks* rotates the plane of polarization of incoming light. However, the rotational effect produced by the liquid crystal cell is independent of the wavelength of the light. (*Shanks*, col. 4, lines 9-12) In contrast, the “optically active liquid” of the present invention rotates polarized light by an amount dependent on the wavelength of the incoming light. See, Specification, page 6, line 4 to page

7, line 12 and FIG. 13.

Shanks also requires the use of birefringent materials (not optically active liquids) to produce color and therefore teaches away from use of an “optically active liquid”. *See, Shanks* at col. 3, lines 21-65. Thus, in *Shanks* “[t]he actual color observed is dependent on the birefringent film, its thickness and its relative angular orientation to the polarized light.” *Shanks* at Abstract. In *Shanks*, the use of birefringent materials is necessary because the color produced is dependent on the actual angle of the optical axis of the birefringent material vis-à-vis the polarization angles of the polarizers. *See, for example, Shanks* at col. 1, lines 45-61; col. 3, lines 32-65; col. 4, lines 64-68; col. 6, lines 35-45; and at col. 7, lines 10-40. In contrast to the birefringent materials described in *Shanks*, the optically active liquid recited in claims 1, 17, 23, 25-27 and 41 has no optical axis. Thus, it would not have been obvious to modify the device of *Shanks* to use an “optically active liquid”.

Further, modifying the device disclosed in *Shanks* to use an “optically active liquid” would require a reconstruction and/or redesign of the elements of *Shanks* (which depends on the optical axis of a birefringent material, *supra.*) and a change in the basic principle under which the device of *Shanks* was designed to operate (i.e., use of birefringent materials rather than optically active liquids, *supra.*). Since modifying the device of *Shanks* to use an optically active liquid would change the principle of operation of the device of *Shanks*, the teaching of *Shanks* is not sufficient to render claims 1, 17, 23, 25-27 and 41 obvious. *See, MPEP* § 2143.02, *citing, In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

In addition, the omission of an element with retention of the element’s function is an indicia of non-obviousness. *See, MPEP* § 2144.04. Here, in order to produce color, the device of *Shanks* requires a liquid crystal cell, a means for applying a variable voltage across the liquid crystal cell and at least one layer of a birefringent material. (*Shanks*, col. 1, lines

20-30, FIGS. 1-3) In contrast, the invention recited in amended claims 1, 17, 23, 25-27 and 41 does not require any of these elements to produce color.

Therefore, independent claims 1, 17, 23, 25-27 and 41, and all claims depending therefrom, are not anticipated by or obvious over *Shanks* alone.

B. *Reznik*

The rejection of claims 17-18 as being anticipated by *Reznik* must be withdrawn. *Reznik* discloses a “transparent phase-rotating dispersive medium located to receive the linearly polarized light and to rotate the angle of polarization thereof as a function of wavelength to thereby produce color separation of the polarized light”. (*Reznik*, at Abstract). However, none of the “transparent phase-rotating dispersive mediums” described in *Reznik* (*Reznik*, col. 2, lines 11-22) are optically active liquids as recited in claim 17.

In addition, *Reznik* teaches altering the thickness and orientation of the dispersive medium in order to build color filters. (See, *Reznik* at col. 3, line 30-34. See also, *Reznik* at col. 3, lines 45-65; col. 4, lines 8-16, 36-44.) The term “orientation” can only refer to “the relative angle between the incident light polarization and the optical axis of the dispersive medium”. (*Reznik*, col. 1, lines 30-31). Thus, the device of *Reznik* requires a dispersive medium having an “optical axis”. In contrast, as set forth above, Applicants’ “optically active liquid” does not have an optical axis. Therefore, independent claim 17 and dependent claim 18 are not anticipated by *Reznik*.

C. Rejections under 35 U.S.C. § 103

1. *Shanks* in view of *Reznik*

The disclosure of *Reznik* does not overcome the deficiencies in the disclosure of *Shanks*

to render independent claims 1, 17, 23, 25, 26, 27 or 41 obvious. “To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP § 2143. Here, neither *Shanks* nor *Reznik* provide any suggestion or motivation to modify or combine their teachings in a manner required to meet claims 1, 17, 23, 25, 26, 27 and 41, because neither reference discloses, teaches or suggests the use of an “optically active liquid”. As discussed above, *Shanks* and *Reznik* both teach using materials having an optical axis in order to produce color, whether it is a birefringent material (*Shanks*) or a transparent phase-rotating dispersive medium (*Reznik*). In contrast, the “optically active liquid” recited in claims 1, 17, 23, 25, 26, 27 and 41 has no optical axis for producing color.

Further, *Shanks* teaches the use of birefringent materials for producing color. In contrast, *Reznik* teaches the use of a transparent phase-rotating dispersive medium to produce color. Thus, combining *Shanks* with *Reznik* would require changing the principle of operation of the device of *Shanks*, which cannot be considered an obvious modification. See, MPEP § 2143.02, citing, *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

Most fundamentally, however, even if *Shanks* and *Reznik* were combined, the resulting combination does not yield the invention recited in claims 1, 17, 23, 25-27 and 41 because, as discussed in detail above, nothing in *Shanks*, or *Reznik* discloses, teaches or suggests an optically active liquid. Independent claims 1, 17, 23, 25, 26, 27 and 41, and all claims depending therefrom, are thus patentable over *Shanks* in view of *Reznik*.

Applicants therefore request reconsideration and withdrawal of the rejections of

dependent claims 8-11, 13, 29 and 30 as being unpatentable over *Shanks* in view of *Reznik*.

B. *Shanks* in view of *Carmichael*

Claims 14-16, 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Shanks* in view of *Carmichael*. Claims 14-16 and 24 depend respectively from independent claims 1 and 23, which are patentable over the combination of *Shanks* in view of *Carmichael*.

Carmichael is similar to *Shanks* in that *Carmichael* does not disclose an “optically active liquid” but rather, a twisted nematic liquid crystal cell (TN LCD) comprised of a liquid crystal aligned in a cell of two glass plates. (*Carmichael*, page 4, lines 24-33, FIG. 1) Also, similar to the liquid crystal cell of *Shanks*, applying a voltage to the TN LCD of *Carmichael* rotates the polarization state of incoming polarized light by 90 degrees, i.e., without any dependence on the wavelength of the incoming polarized light. (*Carmichael*, page 4, line 34 *et seq.*) In contrast, the optically active device recited in the claims rotates incoming polarized light by an amount dependent on the wavelength of the incoming light. (*supra.*)

Further, *Carmichael* does not teach or suggest the use of an “optically active liquid”. Instead, like *Shanks*, *Carmichael* teaches and requires the use of birefringent materials (not optically active liquids) in combination with an applied voltage to produce color. *See*, *Carmichael*, page 4, line 34 to page 5, line 31 and FIGS. 1, 2. Thus, there is no suggestion in either reference to combine their teachings, but even if there was, the combination of *Shanks* and *Carmichael* does not yield the invention recited in independent claims 1 and 23. Thus, the combination of *Shanks* in view of *Carmichael* does not render independent claims 1 and 23, or dependent claims 14-16 and 24, obvious.

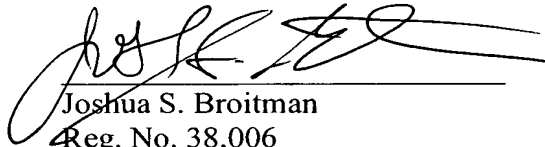
CONCLUSION

For the reasons set forth above, Applicants submit that claims 1-41 are allowable and request that this case be passed to issue. However, if any issue remains to be resolved, Applicants request that the Examiner telephone the undersigned.

Respectfully submitted,

August 15, 2005

Date



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ANNOTATED SHEET SHOWING CHANGES

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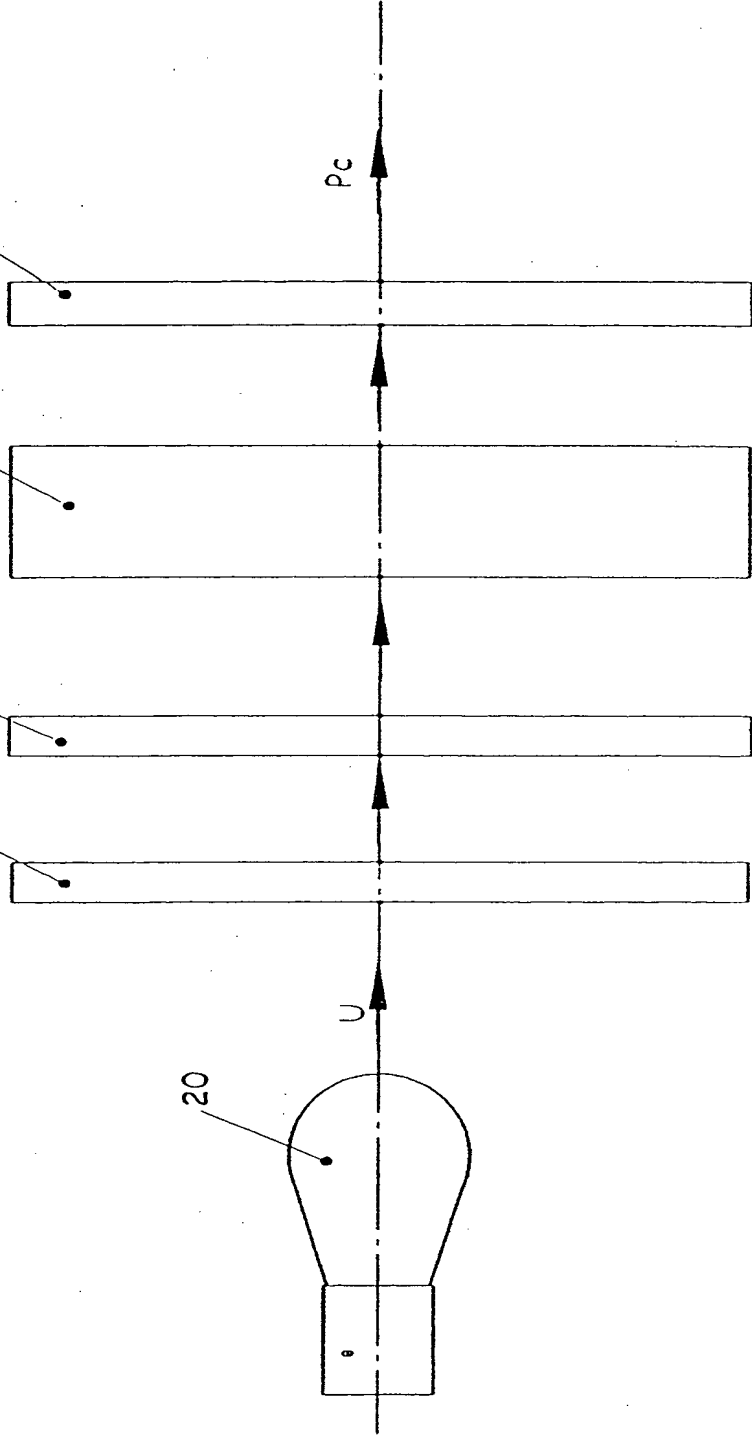


FIG. 2

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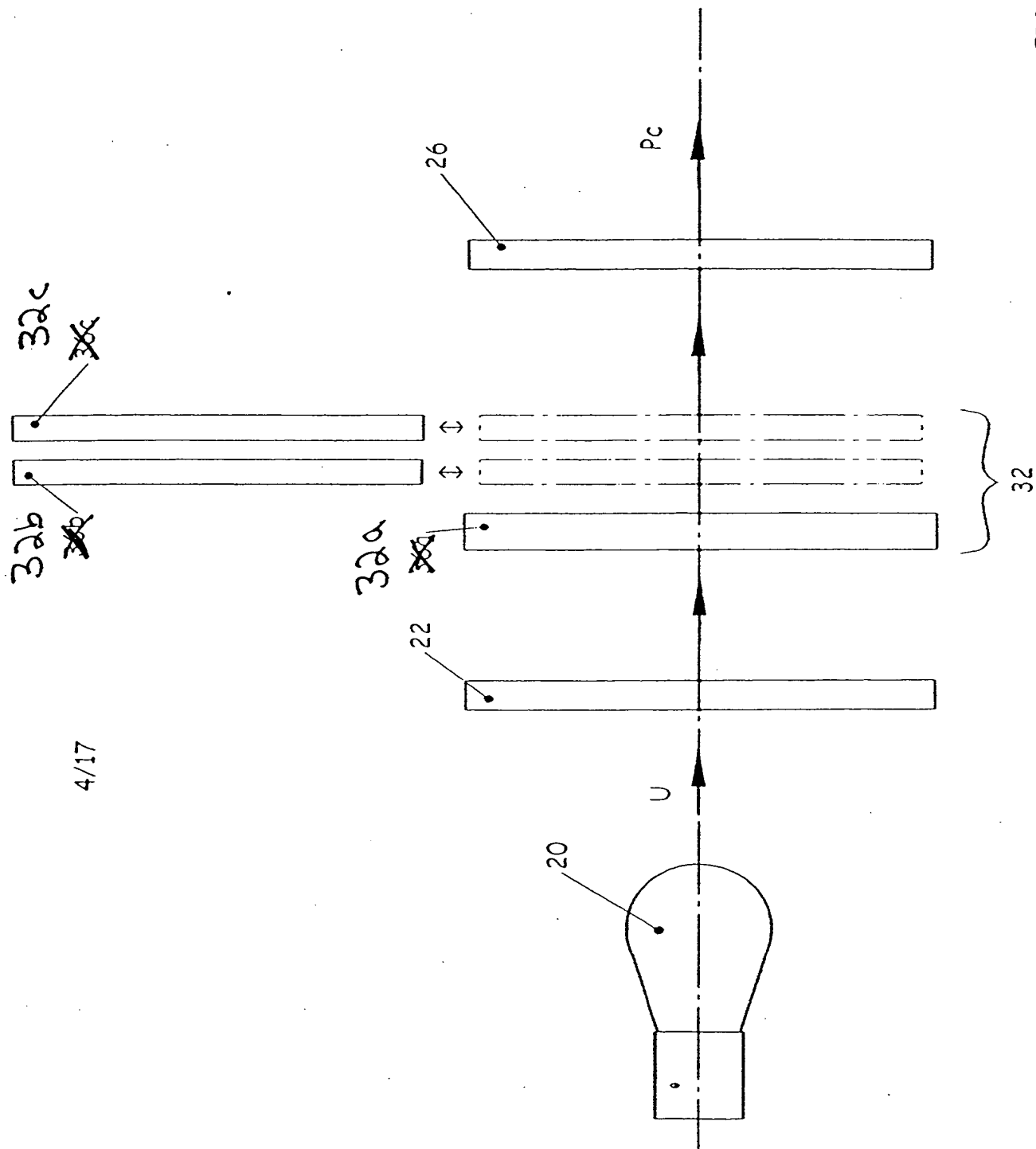


FIG.4

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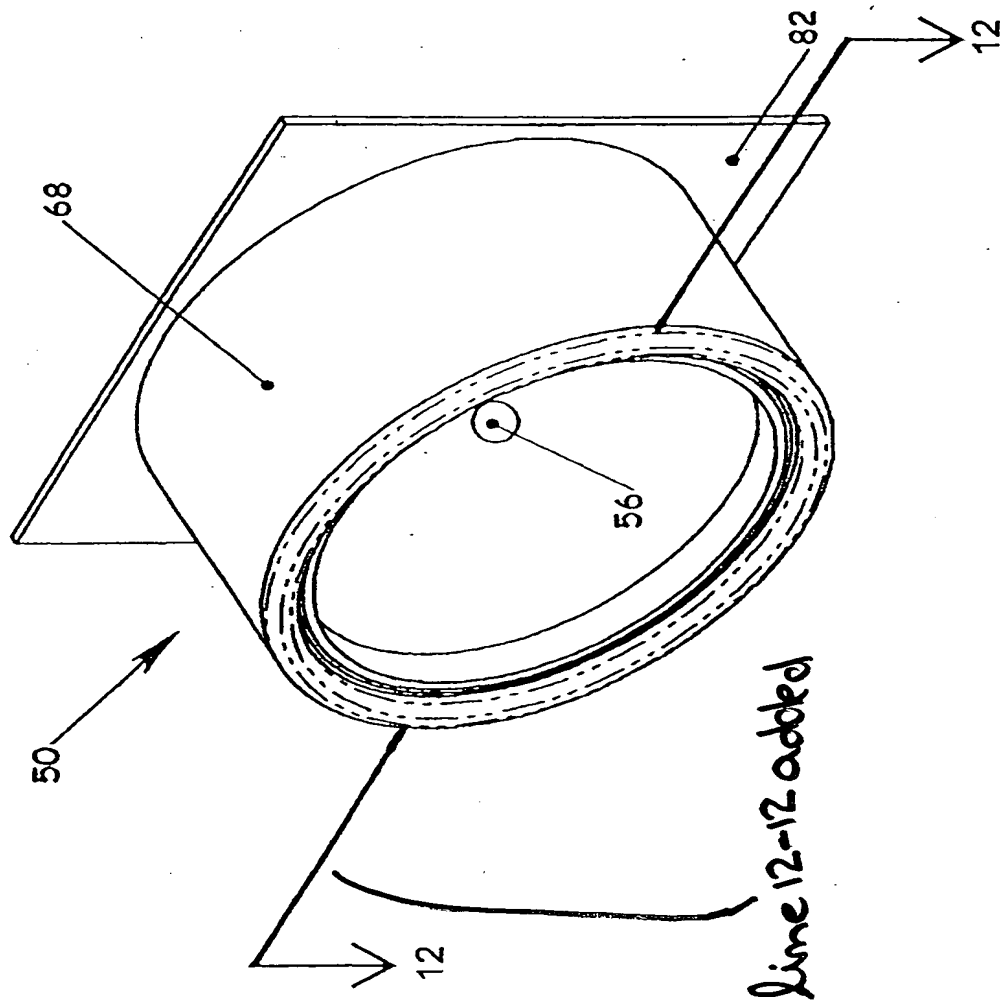


FIG.10

